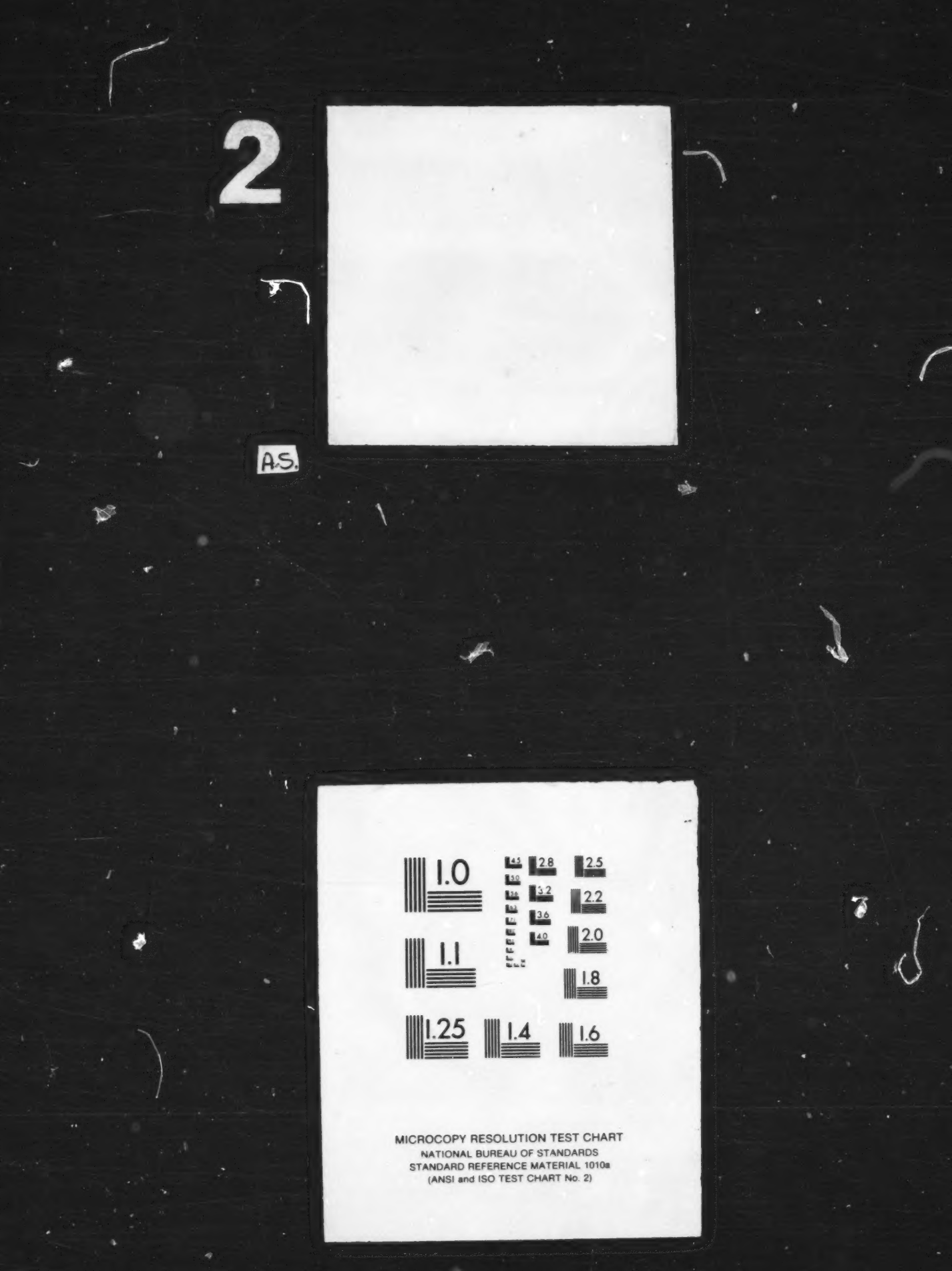
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ABSTRACT

A description is given of the design, use, and evaluation of a series of microcomputer training workshops for teachers. Chapter 1 presents a justification for the program, citing societal, technological, and professional pressures on teachers, and the need for change in educational techniques. In chapter 2, a review of literature is offered on these perceived pressures and needs, along with a review of current thinking on the principles of adult education and computer education. The design of the inservice program, based on research and recommendations on effective inservice programming and recognized methods of microcomputer instruction is described in the third chapter. Chapter 4 includes discussions on trials made of format and content records, how the workshops improved, various groups served, evaluation process, and outcomes for the groups. In chapter 5, a summative evaluation of the program presents information on the sample, audience, data--both pre- and post-inservice, feedback, concerns, and questionnaire results. Chapter 6 offers implications of the program and recommendations for future programs. A summary and conclusion are presented in the final chapter. A bibliography and five appendices containing supplementary materials are included. (JD)

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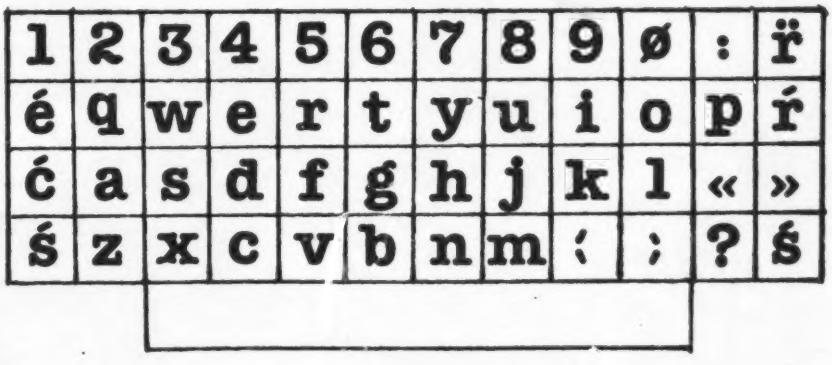
EFFECTIVE MICROCOMPUTER INSERVICE

by

REG NORDMAN



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AN EFFECTIVE MICROCOMPUTER INSERVICE: DESIGNING AND USING AWARENESS WORKSHOPS

by

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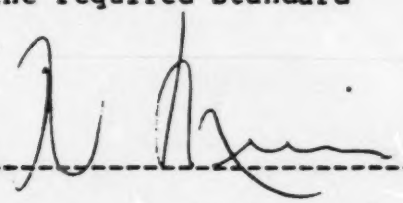
B.Ap.Sc., University of British Columbia, 1973
Dipl.Ed., University of Victoria, 1977

A PROJECT SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF EDUCATION
in the Faculty
of
Education

We accept this project as conforming
to the required standard



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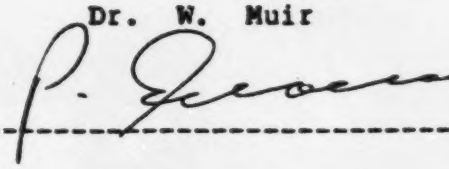

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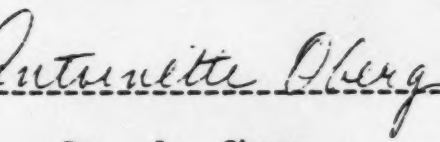

Dr. A. Oberg

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Supervisor: Dr. Walter Muir

ABSTRACT

This project contains a literature review to support the argument that there is a need for effective microcomputer inservice for teachers. A model is designed for a sequence of workshops to satisfy that need. Three workshop levels are outlined. The paper takes a close look at the first year of the model implementation. The results indicate that the design satisfied the requirements found in the literature. These include non-threatening, continuing, sequenced, pragmatic inservice sessions. Appendices contain a sample of inservice content, suggestions for presenters, a computer awareness questionnaire, and classroom responses.

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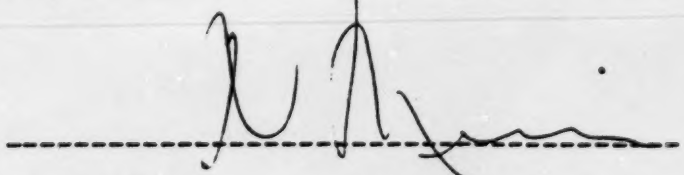

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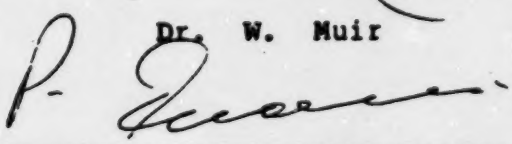

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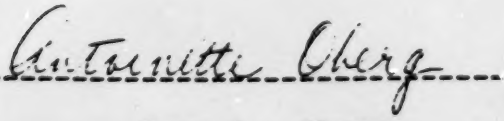

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CHAPTER 1

Introduction

This project is grounded in the argument that microcomputers are entering the school system because of pressures, and needs for system change. The pressures on educators are grouped under one of these three aspects: societal, professional, and technological. The change is required to train educators in the proper use of the technology. But, any large scale change in schools will meet resistance.

Pressures on Educators

Societal Pressures. Media reports, supermarket checkouts, office automation, robots and the local computer store are the daily reality of Western civilization. Students now often come to kindergarten with more computer expertise than the teacher. Countries, like Japan and the United States, which develop and use the new technology, thrive. Failure to keep pace with the technology results in situations like government aid for Chrysler corporation and a diminished capacity to compete in the marketplace. Lay writers and futurists say that the 80's began the computer, information technology age.

The business world is not the sole realm of the new technology, as the home and education computer market is growing exponentially. Several computer companies are targetting present marketing specifically to those two.

(Bowman, 1981). The time is near when computers could be as prevalent as today's calculators.

Professional Pressures. Computers are not new to education. What is novel is the advent of an inexpensive, powerful, and portable computer, the micro. Dickerson and Pritchard (1981) professors in educational technology, University of Florida, write that " A look at the educational community reveals a startling amount of activity...teachers and students are discovering increased opportunities to use microcomputer technology in the classroom" (p. 7).

Professional journals include articles promoting the use of computers in schools. For example Dickerson and Pritchard (1981) continue "Educators must face the possibility that they will be major contributors to computer illiteracy if priorities are not given to the implementation and use of this technology" (p. 8).

Technological Pressures. The new technology adds its pressure by its own rapid growth. Molnar (1981), program manager of Research in Science Education at the U.S. National Science Foundation, describes the computer field as one "where technological change occurs literally overnight and where computer generations are measured in two to three years" (p. 28) .

There are increasing instances of self-taught computer "whiz kids" not needing educational institutions to be successful in entering the job market (Golden, 1982). The

ready market for computing skills means that the 'expert' users are already in lucrative commercial jobs. The expert personnel will always be in short supply especially for relatively low paid education jobs. Therefore, teachers will need to develop their own expertise and materials.

The technology has provided a growing jargon such as bits, bytes, Telidon, and chips, etc. This puts pressure on educators to become literate in this technology as quickly as possible before the next development appears.

Needs For Change

Education is constrained by economics and criticism. What could be useful to educators would be a different way of looking at schooling. For example, the author has read, heard and experienced the problems in motivating children to learn in school. The author has experienced the motivating aspects of microcomputers in his and other classrooms. (Similar to those cited by Forman, 1981 p. 30). Responsive teachers are not ignoring a technology which addresses among other things this need to motivate.

The British Columbia Ministry of Education recognized the need for change, in 1980, by funding, in part, a pilot project which placed 100 microcomputers in the schools of 12 school districts. Many other school districts have started the process of introducing microcomputers into schools.

Teachers recognize that computers will continue their impact on society. As reported by Stevens (1981), a math

professor at the University of Nebraska-Lincoln "92% of teachers in a K-12 survey strongly advocated students should be computer literate by graduation. For the same groups, however, 94% did not feel qualified to teach it" (p. 22).

The number of computers available now are not adequate to service the student population. As Molnar (1981) concludes "In spite of this dramatic growth, [of computer use in schools] large numbers of students never come in contact with the computer" (p. 28).

The British Columbia educational system is short of trained users of the technology. For example, the BC Teachers Federation has 600 registered computer using educators in a population of 28 000 teachers.

Arthur Luehrmann, Director of Computer Research UCLA Berkeley, feels that "the lack of teacher training in technological education is a major obstacle in developing a computer literate society" (p. 102).

Forman (1981), author of the B.C. pilot project report, shows that microcomputer inservice constitutes 62% of teacher administrator concerns. This is supported by Stevens (1981, p. 24).

Resistance of the System

There have been prior technologies which were supposed to revolutionize schooling. Where are the teaching machines, video labs, and television education? Educators are skeptical of innovation as Molnar has said "rapid change is

not easily accepted by a profession such as education, which measures innovative adoption by generations of teachers and decades of time" (1981, p. 28).

Papert (1980), a professor at the Massachusetts Institute of Technology Artificial Intelligence Laboratory, has stated a reason for teacher resistance. He believes that computers have the potential "to challenge current beliefs about who can understand what and at what age. Computers can be carriers of powerful ideas. [They can] help people form new relationships that cut across the disciplinarian lines." This questions much of what goes on in the name of education today.

Teacher ignorance provides resistance to change and Jay (1981, p. 48), a psychology professor at North Adams State College, calls it "computerphobia, a fear of machines". However, Rawitsch (1981), manager of user services for the Minnesota Educational Computing Consortium, maintains that computerphobia can be prevented and treated through a careful teacher preparation program.

Purpose of the Project

There is a need for teachers to learn how to use microcomputers in schools. The problem is how best to serve that need. This project will describe the design, use, and evaluation of a series of inservice workshops which intend to service the need for teacher microcomputer training.

CHAPTER 2

Literature Review

Societal Pressures

Daily life is increasingly computerized. The general public is quick to accept computer use in the marketplace. It is only realistic for this group to expect the educational system to prepare the young for a computer oriented future.

The futurists stress the limits to individual visions of what the future will be (Evans, 1979; Papert, 1980; Toffler, 1980). Their ideas have the commonality of recognizing information as the currency of the future. As reported by Molnar (1981), "developments in science and technology have changed the meaning attached to the verb 'to know' from having information stored in one's memory to the process of having access to information ." The key to present and future access is the computer.

A significant difference between previous and present technology is the degree that the latter has penetrated the home. In 1980, 200 000 home computers were sold in the United States. By 1982, school and home purchases of microcomputers are expected to be more than 600 000. (Diem, 1981, p. 30). By 1983 the Timex watch company will market a home computer costing $100. (Moursund, 1982). Teachers will have students with substantial computing skills entering their classrooms. Student skills and interests have been identified as a major pressure on teachers in curricular decisions (Leithwood, Ross & Montgomery, 1982).

Professional Pressures

As educators become more adept with the new technology, research to support computer use in schools will increase (see Stein, Caputo, Pitscha, and Wagner, 1981).

The following sampling of professional views shows some current thought on microcomputers. Godfrey, of the University of Victoria Creative Writing Department, states "education has existed for a long time without serious competition. No other sector of society is more vulnerable to the new technologies" (1980, p. 159). Eiselle (1980), a curriculum professor at the University of Georgia, continues "the vast majority of classrooms in America enjoy about the same degree of exposure to computers as did turn-of-the-century homes to automobiles and airplanes.... There seems to be sufficient reason for including computer literacy in the curriculum" (pp. 1;9)

The conclusions of the report on the British Columbia Education Ministry microcomputer project (Forman, 1981) include:

> The majority of the teachers across all grade levels felt that instruction with the microcomputer was as effective or more effective than the traditional instruction. They cited increased motivation and achievement gains as what they felt to be the major reasons for the enhancement of the learning situations. The majority were of the opinion that students' attitudes towards learning were improved. (p. 37)

These feelings of British Columbia teachers lend support to Luehrmann's (1980) argument for the inclusion of computers in the school curriculum because "the ability to use computers is as basic and necessary to a person's formal education as reading, writing, and arithmetic" (p. 98).

A global view of computer use in schools is that of Brochmann (1980), "The computer, however is not one tool; it is many. Depending on its configuration and programming, the computer becomes a sophisticated calculator, an accounting machine, a word processor, a filing system, a process controller, or a teaching machine"(p. 45).

Papert continues the tool analogy "a child builds models from the intellectual clay if available. The computer is a brain tool which leads to microworlds. The best learning takes place when the learner takes charge. The child programs the computer, not the reverse" (p. 78). Molnar (1981) states that "Papert's work demonstrates that today's curriculum greatly underestimates the capacity of children to deal with complex problem solving. Computing provides a new way of thinking, and it should be introduced into the curriculum as early as possible" (p. 28).

Professional journals in all content areas have featured computer articles. From decimals to the decathalon someone has used a computer and has reported on the relative success or problems with the technology. Watts (1981), Education professor at Acadia University, has noted over a dozen broad areas for microcomputer use in every school. The list

includes uses in administration, curriculum planning, professional development, library, research, guidance/special services, testing, instructional aids, instructional management, computer assisted learning, computer awareness/literacy, and computer science.

Technological Pressure

Johnson (1982), Director of Academic Computing at the University of Iowa, defines the new technology as a triad:

> Microelectronics, communications, and information science. This new technology presents education with two challenges. It affects what we learn and how we learn. If during the last thirty years the auto industry had made the same progress as the computer industry, a Rolls Royce would cost $2.50 and get 2 000 000 miles per gallon. Costs and size are falling, and energy requirements are diminishing. The new technology is here and being used. It changes skills required in the post-school world; old skills are obsolete and new skills are needed. The new information technology cannot be ignored. (pp. 17-18)

Evans (1979) suggests that computer adept students constitute a future economic and intellectual elite. The author believes that the beginnings of a technological elite are already here. The experts in computing are expensive because they are in very short supply. In California's Silicon Valley , where the technological revolution is focussed in North America, employers offer very luxurious working conditions to attract and keep personnel. Education needs people with the same expertise but is unable to offer similar rewards as industry.

The longer education waits, the harder and more expensive implementation will be. Continuing technological changes do bring price reductions, but they also increase the number of choices available and the number of possible mistakes. One does not purchase computer equipment "off the shelf" and then look for a use. Effective use of a microcomputer requires a knowledge of what one wants it to do. And that necessitates basic knowledge of the technology in order to provide a base for decision making.

The Need for Change

Computers and Teachers. Classroom teachers have found that microcomputers increase motivation and achievement (Forman, 1981, p. 37). In a recent survey, 86% of those teachers surveyed expressed a high interest in computers personally and they felt that the computer belonged in all classrooms ("Computers!", 1981). In the author's own experience, as student attitudes improve, learning improves. It is an interesting speculation, that as computer use in schools increases schools could become more effective learning environments.

The teachers in the British Columbia pilot study agreed that learning outcomes improved or were the same as before the computer came into the classroom (Forman, 1981, p. 37). These were novice users who felt they needed more training for better use of the micros.

Need for Equipment. The author has experienced the frustrations of trying to stretch too few computers among too many students. Luehrmann (1980), Molnar (1981) and the Ontario Teachers' Federation (1981) agree that, a large scale commitment of time and dollars must be made for the purchase of computers and the development of expertise in their use in education.

Need for Training. "All teachers need some retraining and most need a substantial amount" (Moursund, 1981, p. 77). The review of references reinforced this statement. Luehrmann (1979) feels "what is needed is inservice training for existing teachers who are in the process of becoming computer teachers" (p. 102). Dickerson and Pritchard (1981) agree with Moursund and Luehrmann and continue "it is much easier to mass produce microcomputers than trained teachers. A ...deliberate effort...on the part of teacher training institutions is required" (p. 12). Eiselle (1980) makes a case for using computers in schools and agrees that "the teaching staff will, themselves, require certain computing competencies"(p. 89). Stevens (1981) feels that "each school must become involved in...the training of teachers to use computers as instructional tools" (p. 24). Hopper and Bruckhart (1982) point out that "computers still have not had a significant impact on the curriculum in most schools. Teachers are not using them as an instructional tool because they do not know how and are often not aware of their instructuional potential. It is therefore essential that

training in computer literacy be provided and made attractive and usable to large numbers of staff members in any school district beginning an instructional computing program" (p. 93). Rawitsch (1981) writing on the problems of teaching educators about computing says that "as computers are introduced into education, where the majority of users do not have backgrounds in the field of computing, we may soon be saying that 'training' is the most important of all" (p. 31).

A Course of Action. A course of action for British Columbia training is contained in Forman (1981):

> The Ministry [of Education], the Universities, and the Colleges must continue to support and provide a coordinated in-service training effort that will closely monitor the computer literacy level of all teachers in the province and provide for the different levels of interest, expertise, and experience within the province (p. 31)

The BC Teachers Federation has also recognized the need for change and is launching a major computer retraining project for teachers in 1982. The Federation has appointed 16 Professional Development Associates and a Coordinator. These people will develop an inservice model. Districts requiring workshop presenters or organizers can use this resourse. This is a similar system as one recommended by the Ontario Teachers Federation (1981).

Industry is moving toward replacing some educational functions. A recent conversation between the author and a Bell Laboratories Training Division supervisor ended with the comment that educators have perhaps three to five years to

implement computers in schools before industry would be able to deliver a replacement educational system. The new system would be delivered to the home and would bypass schools and teachers. Although extremist in view, there could be growing pressure from this area.

The Resistance of the System

Why have past innovations not worked in schools? Godfrey (1980) feels there are some things about schools which prevent effective change. They are:

> The system is required to process large numbers of students at the same time. Certain teachers appear to be notched with certain students with no attempt to custom fit teacher and student. The system is largely exterior to the students who pass through class after class and teacher after teacher. Records of student progress are only a small measure of what she/he is like. The system can manipulate its grading scheme in order to justify its existence. Most students learn despite the system . All are damaged to some extent with the process remaining the same. (p. 152)

Teaching Machines and Computers. Teaching machines as a technology did not live up to their touted claims of changing the educational process. DeLaurentis (1982), Education Technology Instructor at McGill University, looks at present computer implementation efforts and finds a similarity with teaching machines. He feels that teaching machines, specifically programmed learning, failed because it was a dull technology, the programming was tedious, and teachers lacked expertise. Computers, at present are not dull but

very motivating, still tedious to program, and often beyond the range of a teacher's present expertise.

Extrapolating from DeLaurentis' views, microcomputers in schools could, for a short time, suffer similar implementation problems as teaching machines. To prevent this, there must be improvements in teacher expertise and the removal of tedious programming. As Boyd (1981), an inservice consultant, feels most teachers do not need to learn to program, the push could be to developing teacher expertise in using the technology.

Change and Human Nature. Ed Obie (1981) a microcomputer implementator in Alaskan schools observes that "Implementating change might be a more appropriate term to describe introducing technology. Human nature implies a resistance to change unless the amount of gain is equal to or greater than the amount of effort required" (p. 3). Miller (1981) makes this comment on curricular change "Changing the curriculum is like moving a graveyard. You never know how many friends the dead have until you try to move them" (p. 125).

Challenge to Beliefs. The implementation of the micro technology into schools is a giant task. Mourse[illegible] (1981) feels that:

> Most educators do not yet comprehend the magnitude of the tasks. The entire curriculum needs to be carefully reviewed. All curriculum materials need to be examined and most need to be revised. Over the next two decades educators will come to realize that computers are equivalent to reading, writing, and arithmetic,

> as part of the "basics" of education. Students who receive an instruction fully integrating computers as a topic of instruction, as an aid to problem solving, and as an aid to learning, will have a tremendous advantage over those who do not (p. 77)

Johnson (1981) promotes the following view "If the new technology does nothing more than cause a serious discussion of the goals of education, it will have served a worthwhile purpose" (p. 22). Present educators are generally ignorant of the premise that computers are an "instead of" subject and tool, not a package to add to present curriculum.

Ignorance. Failure to experience the new technology in a positive way could result in computerphobia, what Jay (1981) calls:

> A negative attitude to the new technology. The negative attitude takes the form of resistance to talking or thinking about computer technology, fear or anxiety which may even create physiological consequences, and hostile or aggressive thoughts and acts, indicative of some underlying frustrations. My predictions for the future predict an increase in the incidence of computerphobia for the following reasons:
>
> (1) lack of funds for teachers to attend computer seminars.
>
> (2) lack of funds for incentives to learn about computers.
>
> (3) increased student awareness of computer technology, while teachers remain uneducated.
>
> (4) increased impact of the computer on educational systems without proper planning.
>
> (5) more pervasive use of computers in society in general, due to declining costs of hardware (p. 48).

Weinberg (cited in Menyasz, 1982), a professor of computer studies at St. Joseph's University has identified cyberphobics, sufferers of computerphobia. He believes about 30% of the business population dealing with computers suffer some degree of cyberphobia. Cyberphobics trace this phobia to bad encounters with computers.

Hope for the Future. What happens when teachers are given a chance to work with computers? "Instructor" magazine concluded from their study of computer using teachers "we can set aside the notion that teachers are afraid of computers or that they suffer from 'computer anxiety.' On the contrary, teachers are interested, open-minded, and ready to learn how this technology can make them more effective" ("Computers?", 1982).

Adult Education Principles

Inservice workshops for teachers should reflect the findings of adult education literature. Of interest, is the large amount of "best practises" in the literature in lieu of standard empirical educational research. Perhaps this is due to the focus on training that shows up in the readings.

Knowles' List. Knowles (1978) has outlined some principles of adult education which are replicated in the literature (Bedient, 1981; Feiman, 1981; Holly, 1981; the Ontario Teachers Federation, 1981; and Rubin, 1978). They are:

1. Adults are motivated to learn as they experience needs and interests that learning will satisfy.
2. An adult's orientation to learning is life-centred, therefore use life situations.
3. An adult's experience is the richest resource for his learning, the instructor should analyse this carefully.
4. Adults have a need to be self-directing, therefore use mutual inquiry.
5. Individual differences increase with age. Provide for differences in style, time, place, and pace of learning.

Bedient & Rosenberg (1981), designers of adult education programs, diagram a model for adult instruction following their belief that adults respond to pragmatic, experience orientated sessions. They use peer tutoring and the self-directedness of adults. (see Fig. 1).

The peer counselling and teacher support groups available now operate from a similar view. This idea is also found in coaching theory, that is, a recent successful participant becomes an excellent tutor for novices.

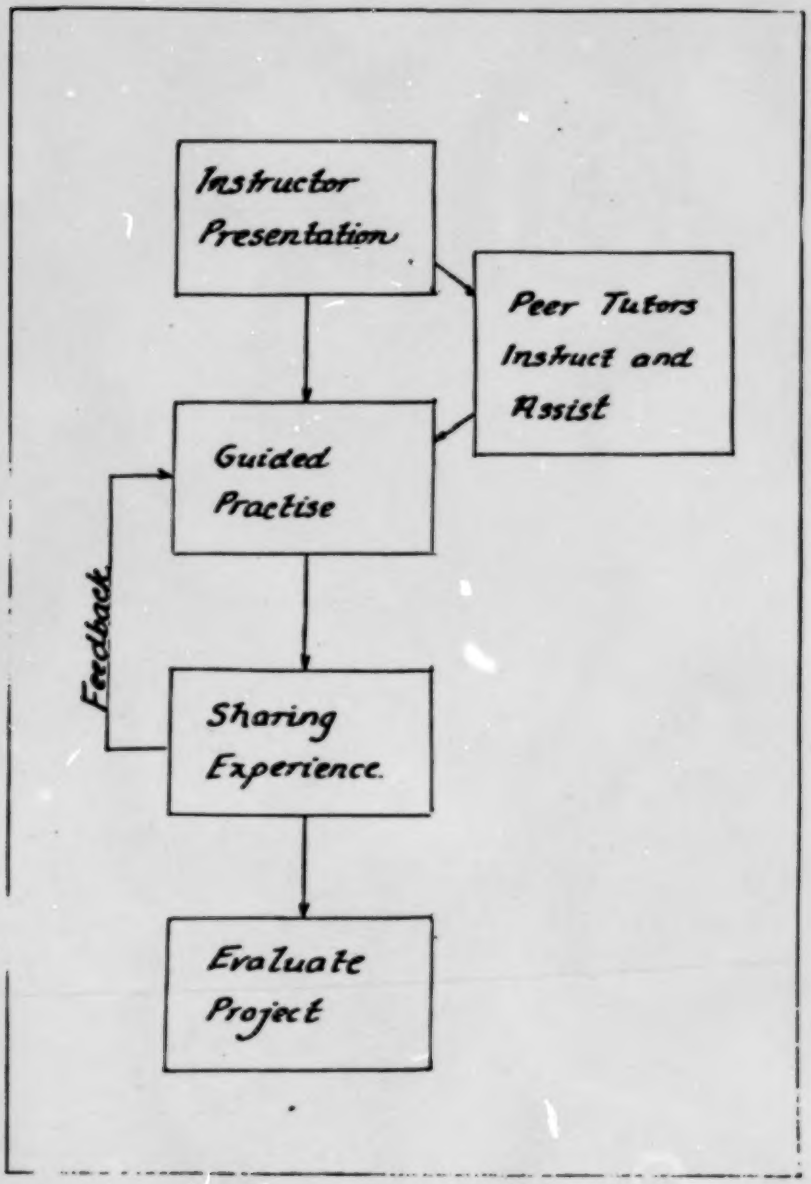

Figure 1 Bedient & Rosenberg inservice model.

This model also allows different curricular viewpoints to be provided by the presenter and tutors. Feiman (1981) was quite concerned about inservice not reflecting a plurality of curricular viewpoints.

A Synthesis of Teacher Inservice. Those authors who address teacher inservice (Burrello and Orbaugh, 1981; Holly, 1981; Johnson, 1975; Ontario Federation of Teachers, 1981; Rubin, 1978; Williamson and Elfman, 1981) stress the following:

1. Teacher retraining should be dealt with in small discrete units.
2. Retraining must be coherently sequenced and of a very high quality.
3. Begin with the teachers' experience.
4. Use alternate training methods.
5. Retrain during the work day at the work site.
6. Select classroom teachers as instructors.
7. Give teachers the opportunity to practise their skills in the classroom.
8. Train an entire school staff.
9. The inservice purpose should be based on classroom tasks.
10. Allow for a skill comparison before and after inservice.
11. Emphasize instructional alternatives.
12. Interrelate curricular growth and professional development.
Teachers should be involved in the identification and articulation of their inservice needs.

Bedient and Rosenberg (1981) would accommodate points 6, 7, 10 and 14 in their model. The instructor, in organizing workshop details, could easily use the remaining points. It seems the computer, an activity based technology, is suited for effective inservice. This is born out by Cruickshank, Lorish, & Thompson (1979), Professors of Education at Ohio State University, who say "programs that emphasized demonstration, supervised trials, and feedback were more successful" (p. 28). With just a slight modificaton, the Bedient and Rosenberg (1981) model could accomodate most of the researched practises and principles. The addition of one cell, classroom use, and a support group session seemed in order. It was necessary to extend the feedback loop to accommodate the above comment of Cruickshank et al (1979). Figure 2 is the modified Bedient and Rosenberg model as used in this project (see Fig. 2).

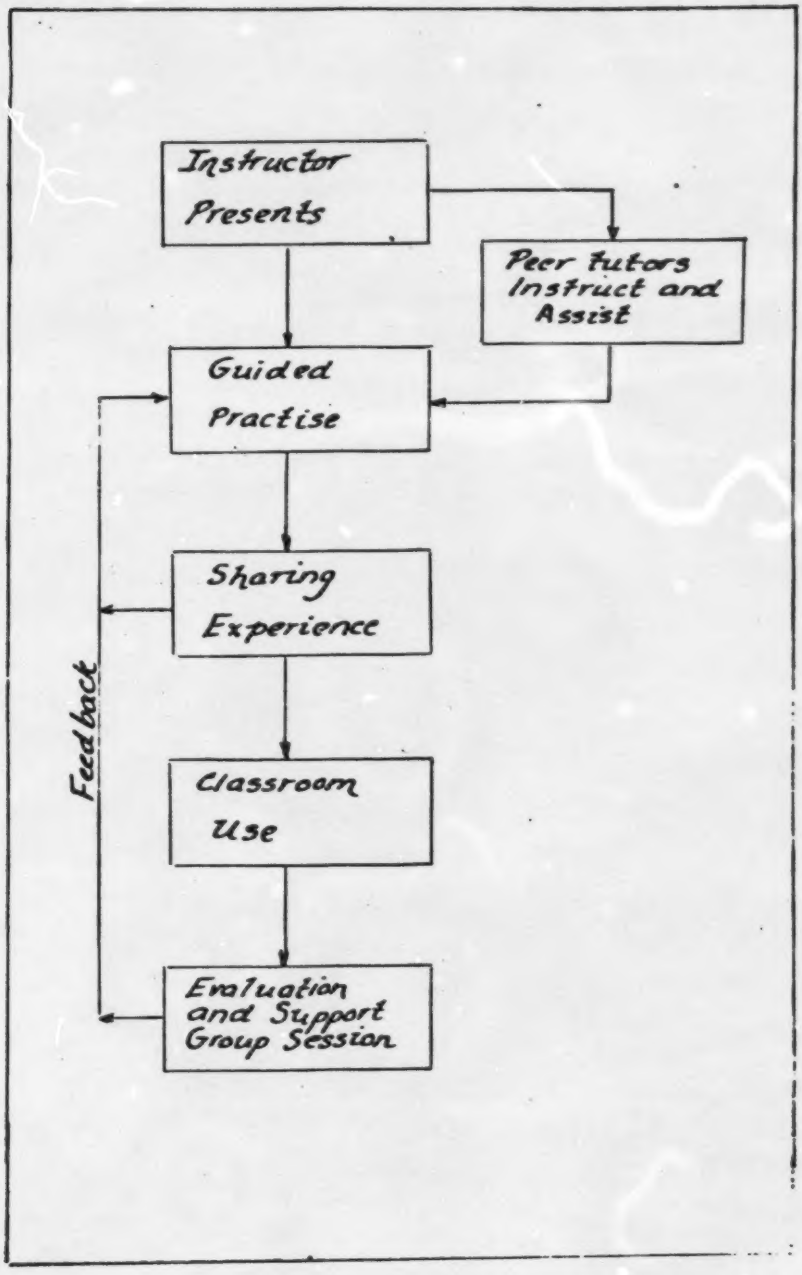

Figure 2 Modified Bedient & Rosenberg model.

Computer Education Ideas

Computer literacy or competency. The image of what is a computer literate teacher or student is a topical subject in the literature. The range of views is interesting to the expert user but confusing to the newcomer.

At one side of the argument are the computer programming specialists, who seem to believe that persons operating a computer should be able to write computer programs (Dennis, 1979). The problem with this stand is that some writers on teacher computer inservice state that the bulk of teachers do not wish to program (Boyd, 1981; Lipson & Lipson, 1982). In the author's experience the introduction of programming to inservice sessions, unless requested by the participants, increases the risk of computerphobia.

At the other end of the literacy arguments, is the "black box" school of thought (Brochmann, 1980). The weakness in this stand is the possibility of promoting too simplistic a view of a sophisticated technology. In the author's experience, as one becomes more competent in computer use a curiosity increases as to how to do more than turn the machine on and run prepared programs.

The bulk of the writings fall somewhere between the above in the realm of common sense (Jay, 1981; Moursund, 1982; Rawitsch, 1981). Whatever view one takes of the meaning of computer literacy, determines the ultimate goal in the inservice program. Society is in a state of flux as to

its image of a computer literate. Really, we as teachers are limited in our ability to see what our students will need to know in their future world. However, they will have to be familiar with a computer. Thus, teachers will have to become aware of the use of computers in schools.

Starting from Brochmann's (1980) view of computer literacy being the ability to use a tool, i. e. a computer, then stages of competence could be definable which move in a direction of increasing complexity. This project selects from the work of Diem (1981), Moursund (1982), and Rawitsch (1981) and places their definitions of computer literacy in a framework of increasing computer competency (see Table 1).

In the text, Rawitsch's work precedes Diem's because of Rawitch's brevity. Rawitsh's statements employ more concepts than Diem and is a better overview. In introducing computer concepts it is good teaching to provide a simple overview (Rawitsch, 1981).

Table 1
Inservice Concepts (computer)

Diem	Rawitsch	Moursund
1.Hardware familiarity	How to operate a computer	Awareness
2.Review software in grade/content area	Use commercial systems	Bring pupils to awareness Evaluate software
3.Best use of computers in curriculum Restructure curriculum	How to put computers into the curriculum	(a) Generate CAL good overview (b) Specific skill in use
4.Use programmer for better software	How to evaluate applications	Use micro to solve problems
5.Staff development ongoing	How to design new applications	Deeper skill programming Computer Sc.
6.	How to program computers	B.Sc. computer in educ. applications

Rawitsch's (1981) outline as to the six stages of computer competency follow:

1. How to operate a computer
2. How to use computer applications
3. How to integrate the computer into the curriculum.
4. How to evaluate computer applications.
5. How to design new applications.
6. How to program computers.

He says that numbers one to five belong in awareness and number six is a programming category. As Boyd (1981) says "what it [the micro] can do is much more important than how it does it" (p. 50)

Jay (1981) agrees with the tool analogy and reminds educators that in order to teach with a tool, one must be able to use it in a variety of conditions (p. 50).

Diem (1981), Professor of Education at the University of Texas, has set up a five stage computer competency program. He is more detailed than Rawitsch and he does not expect teachers to become programmers. This is the sequence:

> Stage 1. Familiarization with available computer hardware, including immediate hands-on experiences with equipment. Machine memory, storage capabilities, and input mechanisms might also make up part of the first overview. This first effort would be of particular importance, since it would deal with much of the mystique surrounding computer technology.

Stage 2. A review of all available software in particular grade and subject matter areas. This review would include the testing and evaluation of classroom software by the teachers as well as reading and discussing descriptions of materials. Local software representatives might be brought in at this point to present materials. A critique and software evaluation form might also be developed at this point. This would be used when purchasing new materials.

Stage 3. Perhaps most critical in training teachers about computers is their reviewing the adopted curriculum to note where computerization is most amenable. Specialists in the area of curriculum would be brought in to help classroom teachers in this process. It is at this juncture that the restructuring of various segments of the curriculum might also occur as computerization takes hold.

Stage 4. Having begun to dissect their courses and curriculum for computerization possibilities, teachers would next meet with a programmer. Ideally, this person would be available for conferencing with teachers throughout the school year. By hiring one such professional, the onus of having to learn complete computer programming techniques would be removed. Naturally, teachers could, and probably would, learn computer language operations, but this would be at their own pace and without undue pressure put upon them. Within the scope of this type of program, and at this stage, the major emphasis would be to familiarize teachers with the capabilities and limitations of computer technology by working with one who has experience in the field.

Stage 5. Ongoing staff development throughout the school year through an observation and critique system with local training staff would be the major follow-up activity. The integration of skills and computerization would be monitored within the context of regular classroom instruction. Critiques and evaluation of these activities would be provided to teachers in the hopes of modifying teaching strategies as well as for evaluation of the program.

Perhaps the most descriptive work to date on what levels of skill a teacher could achieve on computers is that by David Moursund, (1981). He progresses from an awareness level through a functional skill level to a professional skill level. One has reached a particular skill level when one can teach it. Here are his levels:

(1) Awareness of microcomputers (this is Diem's stage 1 and some stage 2).

(2) Experienced at bringing students to level 1. This also involves evaluating the available software.

(3a) Ability to generate Computer Assisted Learning. The teacher uses low level programming skills, perhaps one language. Possession of skills in selecting, evaluating software. A good overview of computers in education is required.

(3b) Substantial skill in computer use, specific to microware, e.g. word processing or information retrieval systems, or individualized educational programs.

(4) Specific and substantial knowledge and use of computers to solve the problems of a particular discipline such as math, science or social studies.

(5) Deeper programming skills and overall computer science knowledge.

(6) Knowledge and skills equivalent to a bachelor's degree in computer science, but oriented to education.

This framework of skills, would be very useful to individuals planning a personalized course of study about computers. It helps prevent mistakes. "Mistakes, such as purchasing equipment without knowing what it will be used for" (Gerhold, 1982). A teacher at Moursund's level 3(b)

knows how he will utilize a computer.

Edwards (cited in Lipson & Lipson, 1982) reports in his study, that once teachers have some exposure to computers they feel they need the following kinds of knowledge:

1. How to use computers in their teaching area.
2. How to increase the number of computers in their school.
3. Where to obtain help in using computers in instruction.
4. Where to obtain information about computer systems and instructional software available.

It appears that successful microcomputer inservice should be prepared to answer those questions.

Affective Components. The design of a successful computer inservice should draw upon the above general and specific inservice findings and guidelines. Not ignoring the affective zone, instructors are to present computers "in a positive, nonthreatening way, giving teachers the background necessary to design a curriculum for students and select equipment necessary to perform the specific task" (Rubillo; 1982, p. 2).

Jay (1981) in an effort to prescribe, for presenters, a remedy for computerphobia, suggests "reinforce the idea they [participants] are 'in control' of technology, they do not need to be programmers or experts in electronics, they are the experts in knowing how to instruct learners" (p. 47).

Use of this style of approach should help release participants from some of the pressures they have experienced. With a well designed, interactive, pragmatic

inservice, the participants should regain a sense of control and competence, a feeling of "doing something". These machines are called "personal" computers and should be dealt with in that manner.

CHAPTER 3

Inservice Design

This inservice project took the recommendations of the above inservice writers and used them in the design of a series of workshops which met a need for microcomputer instruction for teachers. The pressures which affected the teachers were dealt with by the workshops. The design was flexible, and able to incorporate technological changes. The format allayed apprehensions and generated awareness of the microcomputer's possibilities in the classroom. From the literature review, the success of the project seemed likely, as it was in response to felt needs, and the technology could service individual differences.

Bedient Design. The design of inservice workshops came from Bedient and Rosenberg (1981). This model recognized other writer's concerns about inservice. The author found this design to be very easy to use as it is similar to the author's personal teaching style. There was be instructor presentation, guided practise using peer instructors and feedback sessions. Feedback was on an interview basis with the participants and a group support session once there had been time for classroom practise

Peer Tutoring. Peer tutors were selected from recent participants in computer workshops. The first workshop had some "coached" aides, but succeeding workshops were self-sustaining. The tutors' first role was to provide their classroom experience, and their second, a multiplicity of

curricular views and teaching styles with microcomputers. The tutors provided classroom feedback to the instructor.

Sequencing. The sequence of workshops followed Moursund's (1982) and Brochman's (1980) view of movement from awareness to the functional tool stage. There was not an attempt to incorporate programming elements, following Boyd's (1980) view. The growth schemes used Moursund's (1981) skill levels one and two, Rawitsch's (1981) first five components of an inservice plan, and stages one, two, three and five of Diem's (1981) program. There was no consulting programmer available in the author's district as required for Diem's (1981) stage four (see Table 1).

Content. The content of the workshops came from the author's experience, (Nordman & Parker; 1981), and research, (Moursund, 1981; Suffolk County, 1981). Content was also a synthesis of communications with the author's source network. These persons were D. Moursund (University of Oregon), B. Underwood (President BC Computer users group), M. Westrom (University of B. C.), J. Parker & R. Herbison (School District 70). Feedback from the participants and their students also played an important role in subsequent workshop content. There was a preliminary survey of possible participants to help define their needs, as suggested by Rubin (1978).

Modules. The content of the workshops was placed in modules, so that there was a sufficient sequence of information for a teacher to amass and use in his classroom.

The content was classroom oriented, with much "hands on" exposure. The aim was for early workshops to be very pragmatic "black box" affairs.

Time Line. Under the constraints of school years and the principle that the workshops should be on school time, the report for this project covers only a small part of the total inservice model. In one school year, one could work with two or three professional days. By providing separate morning and afternoon sessions, each day provides two inservice workshops. As a consequence, the author expected to move participants through a program using: Moursund's (1982) level one and two, Rawitsch's (1981) steps one and two, and Diem's (1981) stages one and two.(see Table 2). Financial constraints limited machine and software availabilit . Time constraints limited instructor availability.

Table 2
Level A Inservice Concepts (computer)

Diem	Rawitsch	Moursund
1.Hardware familiarity	How to operate a computer	Awareness
2.Review software in grade/content area	Use commercial systems	Bring pupils to awareness Evaluate software

Affective Component. Steps were taken in the project design to recognize the large affective component cited in the literature. There was an attempt to keep participants challenged, but not overworked; excited, but not frenzied. The atmosphere reflected a lucid, balanced sequence of learning events. The author's desire was to present the technology in a nonthreatening manner.

Macrodesign. The workshops' framework consists of three levels of increasing competence. They are:

Level A. Hands on time, a 2 hour introduction using commercial software. The teachers will experiment with the equipment and programs in their classrooms. Presenter and peer tutors troubleshoot individual teachers.

Level B. Sharing of classroom experiences, followed by more software introduction. Participants work on integrating the material into the curriculum. Return to the classroom to practise. (Persons at this stage could be used to instruct level A participants.)

Level C. Compare notes on usage. Develop an evaluative, diagnostic attitude to available software. Brainstorm on new uses for the material. Outline areas of resource and professional weakness. Beginning of felt need for programming skills. (Persons at level C to be used to instruct level B participants.)

Microdesign. This project reports on the first year in a school district (No. 70), where level A workshops were implemented. The workshops were presented to elementary and secondary teachers to familiarize them with microcomputers and the available software.

Framework. The framework of level A workshops is a synthesis from the work of Diem (1981), Moursund (1981) and Rawitsch (1981) (see Table 2).

Inservice Curriculum. The curriculum of the workshops is included as Appendix C. It is a short article on topics covered, points stressed, a list of software and hardware used. The mechanics of setting up a centralized workshop are noted.

Evaluation. The evaluation of the project is formative and summative. Selected participants were checked on skills taught in the workshop. Feedback by the tutors and participants was noted. Equipment borrowings, inservice requests, numbers of teachers serviced, children served, and inservice needs presurvey results are shown. A survey instrument was designed as a class questionnaire to survey the teachers' and students' competency with microcomputers.

Dates. The project ran from September 1981 to June 1982, with May, June 1982 being the evaluative time. There was a teacher support group meeting of participants in June 1982 to help design the next level of workshops, level B.

CHAPTER 4

Computer Inservice Implementation and Formative Evaluation

This chapter includes trials of format and content , records , how the workshops improved, the various groups served, the evaluation process, and outcomes for the groups.

Trial Runs. Initial workshop content and format were given trial runs in Courtenay, Nanaimo, and an Alberni Jr. high school. Modifications were made as a result of these trials.

Pre-survey. A pre inservice survey was sent to all schools in District 70. The results were charted and supported the inservice design. (see Table 3.)

Table 3

Survey of Alberni teachers' inservice ideas

Option (Where , When & Who)	Responses Elem. %	Second. %	Total %
School based, pro. day, District staff.	21	12	33
School based, own time, District staff	4	6	10
District based, pro.day, district staff	18	6	24
District based, pro day, nondistrict staff	-	5	5
District based, own time, district staff	1.5	1.5	3
Credit course, 400 level, University staff	2	12	14
Noncredit course, " , University staff	2	9	11
Total	48.5	51.5	100

Scheduling. The inservices were scheduled for two district professional days. Two sessions were held each day, with a consultative time between.

Training. Initial tutors were contacted and coached in the model. The tutors also aided in the logistics of the inservice. These were: machine transport, setup, teardown, refreshments, software and print duplication, advertising and reserving spaces in the workshops.

Workshop Improvements. At the end of each workshop, the presenter and tutors consulted on the feedback from participants, and improvements to the content and format. For example, a particular piece of software (MECC Elementary Volume 2) was found to generate some confusion and was not used again in level A sessions.

Between the professional days, the author continued reviewing the literature. Any ideas or software which would improve the inservice were incorporated. Also, feedback was sought from participants using computers and their students. The inservice were evolving during the year as information became available.

Records. A record was kept of whether participants were able to use a microcomputer in their classes, and how many students were reached. Any troubleshooting requests after workshops were noted, along with further inservice requests. (see Table 4)

Table 4

Data on post inservice participants

Item	data
Total participants	55
Total machine loans	15
Total students served(elem)	280
Total machine requests	15
Further inservice requests	12
Troubleshooting requests,after:	
First workshop	3
Second workshop	1
Third workshop	0
Fourth workshop	0
Total support group members	7
Total Tutors	5
Total specialist association members	25

Drop in Group. Wednesday afternoons became a drop in time for computer users at the District Resource Centre. A group would attend to view new software, troubleshoot, share teaching ideas, or improve computer skills.

Classroom Visits. A sample of teachers and classrooms (25%) were visited after having used the computers. The author would orally question the class and teacher about the microcomputers. The same questions were used in all classes. Responses and comments were recorded (see Appendix B for the questionnaire and Appendix C for the data).

Support Group Meeting. In June a meeting of inservice participants who had used micros in their classes was held. The purpose of the meeting was to share experiences, provide a forum for questions and support, and help in designing level B workshops.

Summative Evaluation. After this meeting a summative evaluation of the project was carried out. The project report was submitted to committee in July 1982.

CHAPTER 5

Summative Evaluation of Computer Inservice

The sample, audience, data both pre and post inservice, feedback, concerns and questionnaire results are presented in this chapter.

Evaluation procedure. A presurvey of inservice needs (Table 3) was sent to every school in Port Alberni. The potential audience was about 400 teachers. School principals were to poll their staff on microcomputer inservice preferences. Eighty-seven teachers responded to the survey. Following up the nonrespondent schools, indicated their willingness to to go along with the majority decision. Prior polls in the District indicated that a 20% response was normal. Of the respondents, 57% desired a school or district based inservice program using district personnel. If the survey reflected district desires, over 200 teachers would need this type of inservice.

Workshop Participants. The participants were initially from the elementary schools, as they did not have their own microcomputers. To be able to borrow one from the Resource Centre a teacher had to demonstrate at least Level A competence with a microcomputer.

About 14% of the teachers in School District 70 have completed a level A workshop. Each workshop was filled well before the professional day. More Level A workshops have been requested. They will be offered until demand drops off. The goal is to have all teachers in the district complete at

least this level.

Many teachers desired to attend the workshops but had other needs on the professional days or were unable to leave their school. Some principals were unable to see the merit in microcomputer inservice. That is an implementation problem. Any morning session had 100% attendence, afternoon sessions averaged about 70% attendence.

Classroom Users. Of the 55 participants, 15 were able to have a microcomputer in their class. All available machines were used steadily since the workshops. Requests for machines extend until December 1982. Over 280 elementary students were reached by this first year of workshops.

Workshop Feedback. Typical session feedback included: "This is exactly what I wanted; Best inservice I've ever had; I was scared of these machines before, but not now; You do good work; I want a computer in my class, now!" The tutors in the sessions remarked about the group cohesiveness, animation and energy. The participants would ask the tutors the basic, nuts and bolts type, questions rather than the presenter.

Tutor Feedback. The tutors enjoyed the sessions. These teachers showed a high energy level and a desire to have a good inservice session. The tutors demonstrated initiative in many areas of workshop logistics. Many participants have offered to become tutors.

Survey results. The effectiveness of the microcomputer inservices was measured by questioning students and teachers about microcomputers.

Student responses. The classroom survey was very well received in that the responses were very positive. The students demonstrated the level A skills of their teacher. Students were enthusiastic about computers. They commented on the educational, social, and technical aspects of computers. The children said that they now noticed more about how computers were being used about the community. No student felt afraid of the "dumb" computer. The students felt the computer improved the class environment and their self confidence. Some felt they learned more about Math and Spelling. Most indicated they would now want to work in a computer using job when they start work. Many students wanted to buy their own computer. In one class 5 families did just that after classroom introduction of the microcomputer.

Teacher responses. Users felt that the computer fit into the classroom very well. They remarked on the improvements in class atmosphere, achievement in spelling and math, and the ability to make decisions. Teachers noted behavior changes in students, that is the timid became aggresive with the machine or the less social student would share his time in order to get more machine time. Instead of depersonalizing education the machines made it more personal. None of these users went beyond the "black box" usage of the

computer. If the teacher needed to be very structured it seemed to mean that his students were not allowed to get as much "hands on " computer time or certain students would be the "experts" and would do all the loading and setup.

Concerns. Students and teachers want more machines and longer loan times. Some students and teachers now want to learn how to program. Teachers mentioned "instant burnout" from the increased demands on their free time by students wanting to use the computer. Teachers want more preparation time to plan better uses of the machines in their class. The author found it very difficult to gain release time to visit classes. Requests for release time for the teacher support group were not granted. There appears to be a need for increased funding for more machines and release time.

Support Group. An elementary support group has grown out of the June meeting. They are forming a local specialist association of elementary computer users. Agendas and meetings have been set for the 1982/83 school year. The group has prepared a program for the first district professional day in that year. The support group is energetic and very enthusiastic.

Tutors. The tutors are a strong component of the support group. They are continuing to implement the inservice model in the district. These tutors are designing a system of school-based "expert teachers" who would implement school inservice workshops and/or computer study units.

Administrators. Requests for inservice have come from the teachers. Administrators have not been as quick to act. The interest level of the principals did not seem a factor in how one or who uses microcomputers in their class.

Cautionary Note. This project could be operating under a Hawthorn effect for teachers and students. Those initial participants in workshops could be the "keeners" in any implementation. The introduction to the classrooms must have goals beyond just having and using machines. The only way to see if this model continues to work is to monitor it's progress over several years in different School Districts and evaluate how competent the teachers have become in computer use.

CHAPTER 6

Implications and Recommendations

School District 70. The level A workshops have been a viable way to increase computer awareness in teachers. School District 70 has a continuing computer inservice program designed in-district. The presence of a local specialist's association will guide the formation of a grassroots computer literacy curriculum for Port Alberni.

There is a need to provide computer inservice for the administrators and trustees. The funding for more machines and software must come from these two groups. Insufficient funding will seriously deter full use of the model and jeopardize student computer literacy.

Ministry of Education. For the individual school districts which wish to use this model (for example, Nanaimo), the Ministry of Education must critically examine present policies. Many existing systems may have to be dropped as obsolete or not viable (for example, textbooks for all students). An excellent beginning has been made by the Ministry in funding the pilot project, however continued support for implementation is needed. There is a definite leadership role for the Provincial Ministry in helping to place computers into classrooms and analysing the curricular impacts of that move. The first step in this role is to raise the level of computer awareness in Ministry personnel through a computer inservice program.

University of Victoria. The University also has a leadership role in computer implementation. Support by faculty for the initial pilot project districts was provided. Initial microcomputer course offerings are fulfilling many needs of teachers. Pre and post service education in computers will be a growth sector for several years. The University provides a conserving role in education to prevent faddism. There is an emerging need for research into the most appropriate uses of microcomputers and also into the creation of good software. One cannot allow the marketplace to determine education's role in this technology. It is refreshing to notice increasing numbers of microcomputers in faculty offices. As faculty interact with this technology, awareness of the potential will increase.

British Columbia Teachers' Federation. The author was asked to present this project to the Professional Development Associates, the Microcomputers in Education project of the BCTF, to be used in the design of a British Columbia model of inservice available through the BCTF. This BCTF project will help shape the the computer policies of most British Columbia school districts . This project's findings were incorporated into the design of the BCTF model (Appendix E).

Other Implications. This project has been of value in the author's personal, professional, and cognitive development. Researching the importance of the affective component of inservice has improved the author's relations as a teacher, colleague, parent & spouse. The author has become

more knowledgable about inservice and this has opened career doors. The synthesis of material and its' agonizing placement on paper has trained the author in another writing and communicative style. Expertise has been developed in word processing. (The author considers himself to have moved to Moursund's level 3(b), 1981).

CHAPTER 7

Summary and Conclusion

The following chapter includes ways that the microcomputer inservice model in Port Alberni tried to satisfy the compiled criteria of effective teacher inservice. Over the period of September 1981 to June 1982 the project was implemented, evaluated, and documented.

The microcomputer workshops met the criteria researched for teacher inservices in the following ways. There was a response to a felt need for computer inservice. In-district personnel, on non-instuctional days, at the work site, presented small, coherent, high quality workshops. Participants could see an improvement in their own skills. There was an opportunity for classroom use of skills. Classroom teachers were used for the inservice presenter and tutors. The microcomputer was presented as a new or alternate method to help teachers.

The design for the microcomputer inservices also met the requirements of adult education. The content was centred around practical classroom activities. The sessions were informal and voluntary so the teacher participants were free to experiment and be self-directed. The computer dealt with each teacher as an individual. The tutors were present to help the individual teacher and provide alternate curricular views.

The affective needs of the participants were met. The material was presented in a nonthreatening,"you're the experts in teaching" manner. The environment was comfortable, but challenging and stimulating.

With the formation of a support group willing to continue the inservices, the criteria that training must be coherently sequenced was met. The support group has formed a plan for the 1982-1983 school year. This includes school-based workshops, district workshops, and whole school computer study units. This program will continue if the author leaves the district as it is now responding to the felt needs of the support group.

There was a flexibility to the design. Any workshop can follow the same model and incorporate recent technology. This model is transportable beyond computer inservices.

Participants increased their level of computer awareness. Of interest to the author is the close similaritiy between what Edwards (cited in Lipson & Lipson, 1982) has found and what the author found in Port Alberni. The four questions about how to use computers, how to get more computers, where to get help, and where to get information on software and hardware occurred often in post workshop conversation with participants. Thus, the participants had gained a base of knowledge from which to ask these questions. The support group, and Wednesday group, came about primarily to furnish answers to these questions.

The inservices fulfilled a need for microcomputer training. This seems evident since all sessions were filled, requests for more training continue, and the feedback was very positive. All microcomputer inservice needs were not met as the pre-service survey indicated a possible audience of 200 teachers and only 85 were able to attend a session.

Improvements to the inservices should attend to the teachers' concerns about lack of time. Perhaps there should be more attention given to scheduling and management strategies. The support group has started to address this concern.

Computers and other technology will continue to impose pressures on teachers. Education is recognizing the need for change. Some of the resistance of the system to change has been overcome but British Columbia has not dealt with the large scale changes needed. The results of this project indicate that one successful microcomputer inservice implementation was started using what was available in the district. An interesting speculation is that by starting with modest goals and a flexible model, teachers could show leadership in microcomputer implementation.

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Appendix A

Content of Level A

Demonstration

How to unpack and setup computer, disc drive, and monitor. All students will find controller card, rf modulator, and on/off switch on own machine.

Operating The Machine

Look over the keyboard, notice similar and different keys. Stress the metal grounding plate on the on/off switch and the problem of static charges. The instructor needs to talk about the care of the disc and disc drive. Students will learn how to run a program with autostart and PR#6. The instructor should go over the following useful commands:

CATALOG

BRUN BOOT13

LOAD

LIST

RUN HELLO

RUN MENU

CTRL RESET (the panic button)

Some methods of trouble shooting the DOS should be mentioned. For example if booting is a problem, run different discs until one boots, then run the recalcitrant one, always checking for proper centering of the disc (Students should "wiggle" the read head). The student should be able to recognize when the disc is not booting or the DOS

seems faulty (use a disc with faulty sectors to illustrate.)

(Stress what the microcomputer can do, not how it does it.)

Software Experience

Use commercial programs (i. e. MECC) to allow ample experience in booting and interacting with the program. MECC was chosen because of price and availabilty, not because it typified the best. Then, distribute a handout with software descriptions. Make certain that all participants run the APPLE PRESENTS APPLE. All should run MECC Elementary Vol. 1, 3, 4, 7. To show how the microcomputer is a teacher aid, participants should run Teacher Utilities and Grade Book.

When the question of writing progams comes up, stress the time and effort involved in putting together a "good" program. Use the analogy that comparing teacher written software to commercial software is like comparing the local TV presentation to a network special (in format and power, not pedagogy). Students are sophisticated computer graphics and sounds consumers due to video games.

The presenter must be able to recommend where to use certain progams for student and teacher use. Also be ready for questions of software supply and hardware requirements.

Presenters should take a stand on widespread copying of commercial discs. The decision is a personal one. The author is against violating copyright laws at a School District level. Education should be willing to pay the price

of the implementation.

Management Ideas

Provide examples of room setups for different computer uses. Sometimes teachers need aid in how to schedule their computer time to prevent "burnout". Various ways of dealing successfully with supervision have used teachers, aides, students, and parent volunteers. The teachers should have an example of individual and group instruction methods using the computer. Provide some handouts with sample individual and class activities (JEM, MECC, and Arithmetic Teacher are good sources).

Audio-visual aids

Run an ETV program (for example "Now The Chips Are Down", first half.) Display some of the backup materials available from the Resource Centre.

Feedback

During and after the inservice pursue feedback. Teachers seem willing to be up front about how good an inservice is but they often do not volunteer the information. Any written evaluation must be done before they leave the site.

Appendix B

Post Inservice Questionnaire

Administration

The questioning should be in the students' own classroom, with their teacher present. A primary arrangement, of students sitting on the floor, seems the best. If possible, try to have the students close to the questioner. The environment is oral, with students being limited to his/her one best answer to each question. The atmosphere is friendly and open with a "chatting" feeling. Time should be about one hour.

Atmosphere Indicators

The administrator is to note the following parameters. (On the 1 to 5 scale a 1 response is very positive, involved and a 5 response is very negative, uninvolved. In teaching style a 1 means very structured and a 5 means minimum structure.)

Teacher's response to workshop

\+ 1 2 3 4 5 -

Teacher's feelings about students/computers.

\+ 1 2 3 4 5 -

teacher/student relationship.

\+ 1 2 3 4 5 -

Principal's involvement in use.

\+ 1 2 3 4 5 -

Principal feels about micros/education.

\+ 1 2 3 4 5 -

Teacher's style with computers.

Very structured minimum
1 2 3 4 5

Survey Questionnaire

Date:----------

Teacher:----------

Gr:-----Ages:-----

# of students:----

School:----------

Principal:--------

Level A Awareness

Cognitive

(i) Number with hands on experience?

(able to load disc, and operate computer)

(ii) Number aware of care of computer?

(grounding, carts, overheat.)

(iii) Number aware of care of disc and drive?

(static, reading head)

(iv) Number aware of primitive commands?

RUN PR#6 CATALOG MENU, HELLO

(v) Use which software?

MECC Volumes 1 to 9?
APPLE PRESENTS APPLE?

(vi) Strategies needed to play?

Oregon (good ox, shoot early)
Voyageur (barter)

Hurkle (bracketing)

Taxman (subgoals)

Odell (food chain)

(vii) Number who have found themselves noticing more about computers. (Are you more aware of computers?)

(viii) Record comments to question. How could the games be improved to make them better suited for Port Alberni?

Affective

(i) Number which will pursue computer use in school? As a job? Who didn't think they would?

(ii) Number which felt they learned

more

less

same

(while on computer?)

Record responses to why?

(iii) Number which felt a change in class environment

worse environment

same •

improved •

(while computer was in the room)

Record responses to why?

If teacher, relate question increased, same or decreased work load.

(iv) Number which felt computer affected creativity?

less creativity

same •

more •

(v) Number which felt a change in their self-confidence while working on the computer

less self confidence

same ▪ ▪

more ▪ ▪

(vi) Record responses to:

If I had my own micro I would..?

What I liked best about having a class computer ?

What I would do next with a microcomputer?

what I would say to someone afraid of microcomputers?

What I learned about the computer?

What I think my teacher/students felt about the microcomputer?

Do you think computers are important? Why?

What surprised you about the microcomputer?

How many had used a microcomputer before?

How many bought one since?

How many will buy one?

What was your favorite program?

What was your least favorite program?

What movies, T.V. films did you see about microcomputers?

Appendix C

Table 5
Student and Teacher Questionnaire data

Atmosphere indicators

Question	average response
Teacher's response to workshop Great + 1 2 3 4 5 - Awful	1.5
Teacher's feelings about students/computers. Great + 1 2 3 4 5 - Awful	1.75
Teacher/student relationship. Very Good + 1 2 3 4 5 - Very bad	2.1
Principal's involvement in use. Very involved + 1 2 3 4 5 - Zero	4.0
Principal feels about micros/education. Very good + 1 2 3 4 5 - very bad	4.0

All teaching styles were exhibited with the micros.

Survey Questionnaire	Answer
(i) Percentage with hands on experience?	95%
(ii) Percentage aware of care of computer?	95%
(iii) Percentage aware of care of disc and drive?	100%
(iv) Percentage aware of primitive commands?	

Command	RUN	PR#6	CATALOG	MENU/ HELLO
%	100	25	77	100

(v) Use which software?

MECC Volumes (Elementary) 1, 3, 4, 6, 7, were the most popular with volumes 2, 5, being classed as poor by students and teachers. Apple Presents Apple was considered excellent for first exposure to the keyboard.

(vi) Strategies needed to play?

Students were all aware of the strategies required by the simulations. They also identified the ability to make a choice as a stategy.

(vii) Number who have found themselves noticing more about computers. (are you more aware of computers?)

All students responded yes.

(viii) Record comments to question. How could the games be improved to make the m better suited for Port Alberni?

A sample response would include Odell Lake becomes Alberni Canal with killer whales and seals.

Affective Component

(i) Number which will pursue computer use in school? As a job? Who didn't think they would?

86% of the students wished to work on computers as a job.

(ii) Percentage which felt they learned

more	77%
less	0%
same	23%

(while on computer?)

(iii) Percentage which felt a change in class environment

worse	0%
same	17%
improved	83%

(while computer was in the room)

If teacher, relate question to an increased, same or decreased work load.

All teachers mentioned an increased workload.

(iv) Percentage of students which felt the computer affected creativity?

Less	0%
same	38%
more	62%

(v) Percentage which felt a change in their self-confidence while working on the computer

less	0%
same	17%
more	83%

.....

Appendix D

Workshop Organization Ideas.

Location.

If possible go to the school of participants, or a central location, providing a comfortable and pleasant environment. e.g. provide coffee.

Duration.

A maximum of two hours per session.

Mode.

Maximum of teacher participation, lots of hands on. Ideally no more than two people per machine. Some presenters (B. Underwood) find that a one to one teacher to machine ratio is not all that good. The sharing of the experience is important as well. Perhaps teachers spend too much of their day on their own.

Materials.

Use those materials readily available to participants. Have a take-out, loan policy prepared. Use multiple copies, i.e. 60% class set.

Politics.

The machines will be available to those who have attended inservices.

Time.

School time, i.e. Professional days are preferred to weekends. Start a bit late, finish a bit early with a longer lunch break. Provide inservice when the whole staff can attend.

Staffing.

One instructor/aide per six participants. Use district staff whenever possible.

Registration.

Use district newsletter, make available to all comers, but do use preregistration (include name and teaching area).

Preamble focus

Teacher interests have been shown to lie chiefly in these four areas (Marshall, 1981):

1. Content area knowledge.
2. Basic skills planning.
3. Individualized instruction.
4. Discipline techniques.

In the opening remarks, "hook" teachers by referring to how the microcomputer can aid in areas numbered 1-3. For example, Teachers Grade Book for number 3, Milliken Math for number 2, and a MECC science disc for number 1. Appeal to

their own experience and pragmatic nature. Stress the practical/applicable uses. Tie any theory into application.

Present a scope and sequence of what is to be covered, e.g. computer awareness vs. computer literacy.

Use participants from previous A level workshops to aid in further A level workshops. Run B,C levels when need is expressed.

Set and preserve the environment so awareness takes place. Don't stifle it by using jargon. Help the participants find where the material is relevant to them. Always give an overview of where they are going. e.g. "In this workshop you will learn this/this/and this, and not this. " At the end ask," Did you learn anything?

Get the power of analogy working for you. For example, describe a fictitious school which bought some microcomputers and found out afterwards that there was no appropriate software for that machine. A neighbouring school looked around and fitted their machine purchase to the intended use. The first school ended up with poor machine usage and the second had a successful implementation.

Appendix E

BCTF Draft Principles (1982 - 06 - 14)

Microcomputers in Education

General principles

1) Computers which are here to stay, are affecting the workplace, society in general, and MUST affect education.

2) Computer familiarization is an essential component of the general education of students.

3) The microcomputer is a tool to facilitate learning and communications, and it can be used effectively in all curricular aeas.

4) Most teachers are unfamiliar with the language, applications, and possibilities of microcomputers.

5) Most teachers initially want to use the microcomputer, not program it.